

Model Updating Nonlinear System Identification Toolbox, Phase II

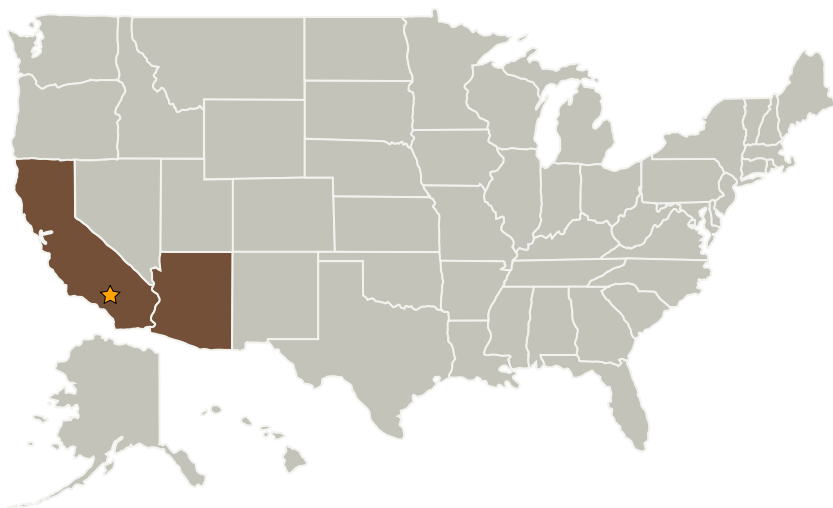
Completed Technology Project (2005 - 2007)



Project Introduction

ZONA Technology (ZONA) proposes to develop an enhanced model updating nonlinear system identification (MUNSID) methodology that utilizes flight data with state-of-the-art control oriented techniques. The MUNSID toolbox augments the current match-point solution approach using the mu-analysis method with identified nonlinear operators. The procedure calls for a high-fidelity linear aeroelastic model to be tuned quickly with available aeroelastic/aeroservoelastic flight data sets, while block-oriented models are used to highlight the underlying nonlinear structure of the dynamic system. This framework is capable of accounting for several nonlinearities including those due to aerodynamics, structures, control/actuator, and/or geometry. Specifically, this on-line Flutter/LCO predictor can be used to accurately estimate a supercritical LCO case if the global nonlinear dynamic behavior is described throughout a hardening nonlinearity, as well as a more dangerous dynamic behavior, denoted as subcritical LCO, could be developed if a global softening nonlinearity is identified. The devised MUNSID Toolbox will become the flight control engineer's "every day tool" to predict on-line Flutter/LCO phenomena. In Phase II, MUNSID will be updated with fast and computationally efficient routines for system modeling, LFT representation, identification of nonlinearity, estimation of uncertainty, and stability analysis. Deliverables include the MUNSID production software including a GUI, a library of S-functions, and the related user manuals.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

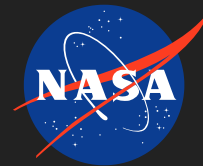
Lead Center / Facility:

Armstrong Flight Research Center (AFRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Armstrong Flight Research Center(AFRC)	Lead Organization	NASA Center	Edwards, California
ZONA Technology, Inc.	Supporting Organization	Industry Small Disadvantaged Business (SDB)	Scottsdale, Arizona

Primary U.S. Work Locations

Arizona	California
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Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX17 Guidance, Navigation, and Control (GN&C)
 - └ TX17.5 GN&C Systems Engineering Technologies
 - └ TX17.5.6 System Identification